

CLAIMS

1. A method of soil-gas analysis prospecting including the steps of:

collecting a plurality of soil samples;

5 subjecting each soil sample to soil-gas analysis for a plurality of signature gases to provide a signature gas value for each signature gas which together comprise a gas analysis subset for each sample;

10 performing a multivariate discriminant analysis by

providing for each sample a plurality of gas ratios by dividing a product of two or more signature gas values by a product of two or more signature gas value for each of the signature gases; and

15 summing the gas ratios for each sample in the subset to provide a composite summed ratio parameter;

and

comparing the composite summed ratio parameter measured from the survey samples with the same parameter measured on samples having predetermined characteristics for a known mineralisation.

20 2. A method of soil geochemistry analysis prospecting including the steps of:

collecting a plurality of soil samples;

25 separating selected component minerals from the samples to provide a corresponding plurality of component enriched samples;

subjecting each said component enriched sample to a geochemical analysis of a plurality of species discernable in said component enriched sample by said geochemical analysis, to provide a species analysis for each said component enriched sample and said 30 species analyses together providing a composite analysis data set;

performing multivariate discriminant analysis according to Claim 1 on the composite analysis data set, and

comparing results of the multivariate discriminant analysis with one or more samples having a known mineralisation.

3. A method of soil geochemistry analysis prospecting including the steps of:

collecting a plurality of soil samples;

separating the clay minerals from the samples to provide a

5 corresponding plurality of clay enriched samples;

subjecting each said clay enriched sample to an analysis of a plurality of adsorbed and/or absorbed species desorbable from said clay sample by said analysis, to provide a desorbed species analysis for each said sample and said desorbed species analyses together

10 providing a composite analysis data set;

performing multivariate discriminant analysis according to Claim 1 on the composite analysis data set, and

comparing results of the multivariate discriminant analysis with one or more samples having a known mineralisation.

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4. A method according to any one of Claims 1 to 3, wherein the soil samples are treated to provide clay enriched samples which are subjected to a desorption process for desorbing desorbable species from the clay.

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5. A method according to Claim 4, wherein the desorption process includes soil desorption pyrolysis.

6. A method according to any one of the preceding claims, wherein the gas ratios are provided by dividing a product of two gas values by a product of two other gas values.

7. A method according to Claim 6, wherein the soil or signature gas analysis is performed for forty-four signature gases using mass spectrometry.